

Tomorrow's Internet Project Office (TIPOFF)

Building on the Success of the Global Environment for Network Innovations

PROGRAM SOLICITATION

NSF 17-540



National Science Foundation

Directorate for Computer & Information Science & Engineering
Division of Computer and Network Systems
Division of Advanced Cyberinfrastructure

Full Proposal Deadline(s) (due by 5 p.m. submitter's local time):

May 02, 2017

IMPORTANT INFORMATION AND REVISION NOTES

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPP) ([NSF 17-1](#)), which is effective for proposals submitted, or due, on or after January 30, 2017.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Tomorrow's Internet Project Office (TIPOFF)
Building on the Success of the Global Environment for Network Innovations

Synopsis of Program:

In order to leverage, advance and strengthen its investments in mid-scale computing research infrastructure, the National Science Foundation's (NSF) Directorate for Computer and Information Science and Engineering (CISE) will support the work of **Tomorrow's Internet Project Office (TIPOFF)**. Working closely with the U.S. academic and industrial computer networking research community, TIPOFF will provide leadership and administrative oversight in developing, deploying and operating innovative mid-scale computing research infrastructure to meet evolving research community needs and align with emerging national priorities.

To initiate this activity, TIPOFF will assume responsibility for the operation and future evolution of the Global Environment for Network Innovations (GENI) platform. TIPOFF will then lead the research community in developing an expanded and enriched experimental platform ("Platform") that leverages the existing GENI infrastructure to support exploration of robust new networking and distributed systems architectures, services and applications. This Platform will serve as a virtual laboratory for research and education, with the goal of advancing understanding of computing and communication systems and sustaining U.S. technology leadership and competitiveness in information technology (IT) and Internet-based services.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

Jack Brassil, Program Director, CISE/CNS, telephone: (703) 292-8950, email: jbrassil@nsf.gov Kevin Thompson, Program Director, CISE/ACI, telephone: (703) 292-4220, email: kthomps@nsf.gov

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

47.070 --- Computer and Information Science and Engineering

Award Information

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 1

Anticipated Funding Amount: \$10,000,000

Subject to the availability of funds, the anticipated total funding amount is \$10 million over the duration of the project.

Administrative project management and operations costs for TIPOFF should be less than \$2.0 million per year for three years.

The costs of replacing, updating and/or extending existing infrastructure should be less than \$2.0 million per year for two years. The actual cost associated with computing resource recapitalization is expected to reflect the ambition of the research community/TIPOFF consensus on Platform goals and strategies, the extent of hardware replenishment needed, and the introduction of innovative hardware and software.

Proposals submitted in response to this solicitation should provide a framework for pursuing design, development, deployment, operations and system upgrade/refresh activities, and should describe one or more technical/operational approaches to deploying Platform resources to address new research community needs and emerging national priorities. Proposals should present specifics related to administrative project management. Proposals may identify participating institution(s) that extend the project management capabilities of the lead institution. Proposals should **not** identify subawardees beyond the participating institutions that will fulfill the Platform's technical design, development, and deployment.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in, the US acting on behalf of their faculty members. Such organizations also are referred to as academic institutions. Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities. For-profit organizations: U.S. commercial organizations, especially small businesses with strong capabilities in scientific or engineering research or education.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization: 1

An organization may participate in no more than one TIPOFF proposal submitted to this solicitation, either as a lead or a subawardee. For proposals involving multiple institutions, only one institution should submit the proposal, with funding for participating institutions made through subawards. In other words, joint projects should **not** be submitted as linked collaborative proposals. See PAPPG Chapter II.D.3.a for additional information.

Limit on Number of Proposals per PI or Co-PI: 1

An individual may appear as PI, Co-PI, Senior Personnel or Consultant on no more than one TIPOFF proposal submitted to this solicitation. In the event that an individual exceeds this limit, the first proposal received within the limits will be accepted based on the earliest date and time of proposal submission (i.e., the first proposal received will be accepted and the remainder will be returned without review). **No exceptions will be made.**

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

Letters of Intent: Not required **Preliminary Proposal Submission:** Not required **Full Proposals:**

Full Proposals submitted via FastLane: *NSF Proposal and Award Policies and Procedures Guide* (PAPPG) guidelines apply. The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp. Full Proposals submitted via Grants.gov: *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov* guidelines apply (Note: The *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide).

B. Budgetary Information

Cost Sharing Requirements:

Inclusion of voluntary committed cost sharing is prohibited. **Indirect Cost (F&A) Limitations:**

Not Applicable **Other Budgetary Limitations:**

Not Applicable

C. Due Dates

Full Proposal Deadline(s) (due by 5 p.m. submitter's local time):

May 02, 2017

Proposal Review Information Criteria

Merit Review Criteria:

National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions:

Additional award conditions apply. Please see the full text of this solicitation for further information.

Reporting Requirements:

Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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I. INTRODUCTION

To support the ongoing activities and expanding capabilities of CISE mid-scale computing research infrastructure, NSF will support the work of *Tomorrow's Internet Project Office* (TIPOFF or "Project Office"). Working closely with the U.S. academic and industry research communities in distributed computing and networking, TIPOFF will assume responsibility for the operation and administration of the GENI infrastructure, as well as its future design and development. A key role for TIPOFF is to lead the community in adapting and recasting current platform resources in light of new research community needs and emerging national priorities. Many of these needs and priorities have been discussed among the research community at events such as the "[Beyond Today's Internet](#)" series of workshops held in early 2016.

As part of the establishment of TIPOFF, NSF anticipates the formation of an independent, community-led advisory entity (the "Steering Group") to represent the views of stakeholders -- including users, experimenters, developers, hosting institutions, industry, and educators -- in future mid-scale networking and distributed computing research infrastructure. TIPOFF and the Steering Group will together develop and participate in a new governance structure guiding the future evolution of the Platform. TIPOFF and the Steering

Group will establish research priorities for the Platform jointly with NSF, with the goal of supporting new research directions. It is anticipated that TIPOFF will have considerable flexibility in leveraging the current platform. Depending on the stakeholders' degree of technical ambition, TIPOFF can reshape the existing platform resources into an entirely new and reimagined infrastructure to meet research community needs and national priorities.

In the past decade, experimentation on the GENI platform has led to innovations in network science, architectures, and services and applications that have supported US economic growth in IT. Various concepts central to the development of Software-Defined Networking (SDN), virtualized or *sliced* networks, and decentralized data centers emerged from early investigations and deployments on GENI. Further, empirical investigations key to interconnecting and sharing (i.e., federating) diverse, geographically-separated computing resources have facilitated the interoperation of experimental systems and instruments, linking the existing platform with other CISE research infrastructures such as the [NSFFutureCloud](#) systems. These advances have equipped US researchers with the technology, protocols and mechanisms to interconnect GENI and non-GENI computing resources located inside and outside the US. Leveraging this success, TIPOFF is expected to develop and execute a vision of a refashioned Platform capable of serving the community and sustainably supporting comparable scientific advances in the coming decade.

The focus of experimentation on the GENI platform has evolved over time. For example, recent research projects have provided computing resources as local hubs (i.e., points-of-presence) for emerging delay-sensitive [US Ignite](#) "smart city/community" applications. Platform resources have also served as a decentralized or "edge" compute cloud that extends the function and geographic reach of other NSF/CISE mid-scale research infrastructure. NSF anticipates that the Platform's computing resources and national communication infrastructure will continue to have broad and wide-ranging applications, such as serving to interconnect and integrate the anticipated [Platforms for Advanced Wireless Research](#) (PAWR). These emerging roles for this Platform can invigorate and amplify its research value and extend its contributions to US competitiveness in IT and economic growth for years to come.

Over the long term, this Platform, together with other CISE mid-scale research cyberinfrastructure, should provide ongoing support for research performed in the CNS core programs ([NSF 16-579](#)); and crosscutting programs such as Smart & Connected Communities ([NSF 16-610](#)), Cyber-Physical Systems ([NSF 17-529](#)), Secure and Trustworthy Cyberspace ([NSF 16-580](#)), and Smart and Connected Health ([NSF 16-601](#)), to name a few.

II. PROGRAM DESCRIPTION

Proposers responding to this solicitation will seek to serve as TIPOFF and 1) lead the community in re-envisioning the current platform in light of new research community needs and emerging national priorities; 2) continue to centrally operate, administer and maintain the current platform, including overseeing all design, development, and deployment activities; and 3) identify and engage appropriate partners with experience in planning, developing, and supporting research infrastructure development projects to implement and sustain the envisioned Platform. Proposers should consider all the information in this Program Description (and elsewhere throughout this solicitation) when preparing submissions.

To ensure that all Platform activities are driven by fundamental research opportunities, TIPOFF will work closely with the systems and networking research community in all aspects of the design, development, deployment, and operations of the Platform. It is expected that a community-led Steering Group will be formed to provide input to TIPOFF and NSF on various aspects of the deployment and operation of this Platform, including identification of Platform enhancements that will best serve the broad research community.

TIPOFF Management

TIPOFF requires a dedicated and experienced project staff whose expertise includes: a demonstrated ability to work collaboratively and provide services to the research community; effective management of advanced networking and computing infrastructure projects with heterogeneous components, including planning, deployment, and operations; effective management of large-scale hardware- and software-intensive projects that include design, development, implementation, and maintenance aspects; financial management and contract management; technical report editing; and web-based communication and outreach to the broader scientific community as well as the general public.

The lead Principal Investigator (PI) will serve as the "Project Director" for TIPOFF and work full-time with direct day-to-day involvement in the Project Office. The Project Director must have an established track record of leadership and management of teams and projects of comparable scale and scope. The Project Director will have overall responsibility for the Project Office, and thus will play a critical role in its success. The Project Director will work closely with cognizant NSF Program Officers and the Steering Group to keep all parties informed of TIPOFF activities and to solicit input on aspects related to project planning and implementation. Additionally, the Project Director is expected to serve as an *ex officio* member of the Steering Group.

The Project Office must have dedicated office and meeting facilities, including meeting space suitable for hosting planning activities.

A brief transition period is anticipated, during which NSF support for both the GPO and TIPOFF overlap in time. During this period the Project Office will engage the GPO to facilitate the transition of leadership, and will seek to ensure that current platform operations continue with limited disruption and operational duties migrate seamlessly.

NSF anticipates that the key tasks occupying the Project Office will evolve over time. Within six months of its establishment and annually thereafter (i.e., within six months of receipt of NSF funding), the Project Director will be expected to provide to NSF a Platform Prospectus document (i.e., strategy and implementation overview), including 1) a vision and roadmap for the evolved Platform that addresses new and anticipated research community needs and emerging national priorities; 2) a detailed plan for continuing current platform operations, administration, education and outreach; 3) a detailed plan for replenishing and augmenting existing computing and communication resources aligned with the vision; 4) a plan for sustaining the Platform for the benefit of the research community after the expiration of the current project funding; and 5) a plan for tracking and measuring the impact and benefit of the Platform to the research community.

The Project Office will be periodically evaluated by an independent team assigned by NSF. The evaluation team will: 1) collect and analyze NSF-required performance data; 2) provide NSF with an independent external assessment of TIPOFF activities and impact;

and 3) provide feedback and work with the Project Office to help it meet the requirements of this solicitation. The Project Office is required to provide all necessary data and materials to NSF and the evaluators in a timely fashion, in order to enable the evaluators to fulfill their responsibilities.

Platform Visioning: Identifying an Expanded Role for the Platform

The Project Office is expected to lead the process of identifying, evangelizing and realizing an innovation-oriented role for this Platform in the coming decade. In recent years, the GPO's focus has shifted from spiral system development and expansion to other important areas, such as education and outreach. During this time, the research community needs have also evolved in ways that GENI developers could not have fully anticipated. A key task for Project Office leadership is to work with representative groups of stakeholders to identify and plan for ways to enable the Platform to meet evolving CISE research community needs and national priorities over the next five to 10 years. The technical vision and identification of desirable advanced computing and communication resources (i.e., excursions) should position this Platform to complement and interoperate with other CISE mid-scale research infrastructures to provide opportunities for synergistic cross-platform experimentation.

Platform Ongoing: Maintaining Platform Operations

The Project Office is expected to maintain ongoing operation of the existing infrastructure as well as enhancements and additions over the project lifetime. This activity includes ensuring the availability of the Platform to the experimenter community, protecting Platform assets, enforcing access policies, and supporting regular community education and outreach events. Examples of the activities to be performed by the Project Office include:

Maintaining and documenting Platform design, specifications, and scope of work; Organizing education and outreach events, including engineering conferences and regional workshops; Periodically submitting reports on technical and financial status, operations and maintenance costs, and Platform usage; Finalizing a risk analysis and mitigation plan, including a security plan that protects Platform resources from malicious attack or malevolent use; Maintaining commitments with academic, industry, federal agency and international partners; and Completing a detailed deployment plan for replacing and upgrading equipment, including a bottom-up cost estimate and contingency calculations linked to risk assessment.

The Project Office should strive to innovate in the application of relevant best practices [e.g., development and operations (DevOps) tools and processes] and encourage adoption of successful practices by subawardees.

Platform Enriching: Upgrading Infrastructure

The Project Office will work to transform existing resources (e.g., communication, computation and storage) to realize the envisioned Platform. The visioning activity described above will inform the process of modernizing and extending current infrastructure, balancing requirements to update existing hardware and software with the need to introduce entirely new and innovative system components.

To instantiate the envisioned system, TIPOFF will issue one or more Requests for Proposals (RFP) calling for the development of infrastructure components. Examples of such a component could be as modest as an updated Platform aggregate, or as ambitious as deployment of an entirely new open-source network operating system spanning the Platform. Each RFP will articulate the desired capabilities of the components, the deployment and operational support, and the oversight that the Project Office will provide to the selected awardees. The Project Office will issue an initial RFP within nine months of its establishment (i.e., within nine months of initial awarding of NSF funds), and after receiving NSF approval for the Platform Prospectus described above. The Project Office will advertise each RFP throughout the appropriate research community, following up with outreach efforts to the various stakeholders to explain the key aspects of the RFP.

TIPOFF will be responsible for a review of proposals received in response to an RFP that uses the standards of the NSF merit review process as a model, including practices pertaining to confidentiality of reviewers and management of conflicts of interest. Reviews will consider the degree to which proposals have a substantial potential for influencing the direction of TIPOFF's long-term plans. The Project Office must demonstrate a strong commitment to broadening participation, as does NSF (<https://www.nsf.gov/od/broadeningparticipation/bp.jsp>), and will provide the same considerations as NSF to the diversity of proposing teams in the evaluation of the proposals. Projects funded under TIPOFF RFPs will be subawardees of TIPOFF. Proposals and other relevant information, including reviews, will be shared with NSF.

The Project Office members participating in each review and/or award process will also be asked to identify all active or recent Collaborators or other affiliations with all personnel involved with the proposed subawardee team.

The Project Office shall work closely with the subawardee organization(s) to support the design, development, deployment, and operation of each infrastructure component. The Project Office shall provide common guidelines, management structures, and operational interfaces, including infrastructure test and validation procedures, equipment upgrade processes, and software design guidelines.

TIPOFF must take the following steps prior to component deployment:

Document a plan for component acceptance testing; Establish a detailed component deployment plan, including assessing component integration risk and proposing contingency plans; Demonstrate successful development and prototyping of the component; and Ensure the readiness of the core organization responsible for the overall deployment of the component.

Platform Sustaining: Lasting support for the Platform

The envisioned Platform should continue to be a valuable experimental resource for the networking and distributed systems research communities for the foreseeable future. To support such a lasting resource, TIPOFF is expected to lead the process of identifying approaches to sustaining the Platform beyond the NSF-funded project lifetime—ideally for the next decade, or longer.

Platform sustainability should be achieved and supported by decisions and actions across all aspects of TIPOFF. Various models, including chargeback (i.e., building the cost of supporting the Platform into the costs of the research and education activities deriving benefit from it) should be considered. The Platform Visioning activity (described above) is intended to identify a Platform that it is capable of evolving to meet the changing needs of a broad computing research community. Similarly, Platform Enriching should aim for reliance on open-source software implementation and community support for sustainment.

The Project Director is required to provide NSF with a Platform Sustainment Plan within 12 months of TIPOFF establishment (i.e., within 12 months of initial awarding of NSF funds). This sustainment document will be a comprehensive examination of the steps the Project Office and the Steering Group are jointly taking to establish lasting, sustainable infrastructure for the research community. The Platform Sustainment Plan should explicitly describe how the Platform will be self-sustaining three years after the initiation of the TIPOFF award. This Plan is required to be updated annually, and will include measures demonstrating how self-funding activities are tracking projected sustainability metrics.

III. AWARD INFORMATION

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 1

Anticipated Funding Amount: \$10,000,000

Subject to the availability of funds, the anticipated total funding amount is \$10 million over the duration of the project.

Administrative project management and operations costs for TIPOFF should be less than \$2.0 million per year for three years.

The costs of replacing, updating and/or extending existing infrastructure should be less than \$2.0 million per year for two years. The actual cost associated with computing resource recapitalization is expected to reflect the ambition of the research community/TIPOFF consensus on Platform goals and strategies, the extent of hardware replenishment needed, and the introduction of innovative hardware and software.

Proposals submitted in response to this solicitation should provide a framework for pursuing design, development, deployment, operations and system upgrade/refresh activities, and should describe one or more technical/operational approaches to deploying Platform resources to address new research community needs and emerging national priorities. Proposals should present specifics related to administrative project management. Proposals may identify participating institution(s) that extend the project management capabilities of the lead institution. Proposals should **not** identify subawardees beyond the participating institutions that will fulfill the Platform's technical design, development, and deployment.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in, the US acting on behalf of their faculty members. Such organizations also are referred to as academic institutions. Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities. For-profit organizations: U.S. commercial organizations, especially small businesses with strong capabilities in scientific or engineering research or education.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization: 1

An organization may participate in no more than one TIPOFF proposal submitted to this solicitation, either as a lead or a subawardee. For proposals involving multiple institutions, only one institution should submit the proposal, with funding for participating institutions made through subawards. In other words, joint projects should **not** be submitted as linked collaborative proposals. See PAPPG Chapter II.D.3.a for additional information.

Limit on Number of Proposals per PI or Co-PI: 1

An individual may appear as PI, Co-PI, Senior Personnel or Consultant on no more than one TIPOFF proposal submitted to this solicitation. In the event that an individual exceeds this limit, the first proposal received within the limits will be accepted based on the earliest date and time of proposal submission (i.e., the first proposal received will be accepted and the remainder will be returned without review). **No exceptions will be made.**

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nspfubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov*. The complete text of the *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nspfubs@nsf.gov.

See PAPPG Chapter II.C.2 for guidance on the required sections of a full research proposal submitted to NSF. Please note that the proposal preparation instructions provided in this program solicitation may deviate from the PAPPG instructions.

Proposal Titles: The proposal title must begin with "TIPOFF", followed by a colon, followed by the project title. For example, titles should take the form, **TIPOFF: Title**.

Project Description: The Project Description section must not exceed **30 pages** including figures, charts, graphs, maps, photographs, and other pictorial representations. **Proposals exceeding this length will be returned without review.**

The Project Description **MUST** contain the following sections with the headings shown below.

II.1 Scope of Work

The Scope of Work should describe in detail the effort necessary to carry out the Platform *Visioning, Ongoing, Enriching, and Sustaining* activities discussed in the Program Description (Section II of this solicitation); describe the design, development and deployment process steps, including the process of selecting the subawardees; identify and discuss all project goals and associated milestones; and describe the scope of work necessary to support experimenters as well as ongoing education and outreach functions.

The Scope of Work should provide a comprehensive, concise description of project management activities, aligning these activities with Platform goals and milestones; provide rationale for why these activities are required as well as who will lead, facilitate, and participate in them (citing backgrounds, disciplines, sectors, etc., rather than specific participant names); and provide the methods and metrics that will be used to evaluate TIPOFF's efficacy.

Proposers should not identify specific development and deployment activities; instead, proposers should describe the processes that they will employ to identify, prioritize, and support necessary development and deployment activities.

II.2. Risk Mitigation Plan

The Risk Mitigation Plan should discuss any risks associated with completing Platform design, development, and deployment activities, including technical and organizational risks, and lessons learned by the proposing team from past experiences.

II.3. Project Schedule

The Project Schedule should provide a Gantt chart identifying key milestones and major activities over the project period, and should identify and discuss the critical path from design and development to the deployment phases of the Project Office. The Project Schedule should show the sequencing of all major activities in sufficient detail to justify the proposed budget. The Project Office will host a Concept Design Review (CDR) within six months of the award, and a Preliminary Design Review (PDR) within the subsequent three-month period. A Conceptual Design must include a:

description of the research infrastructure and technical requirements needed to meet the science, including a definition and relative prioritization of the research objectives and science questions the proposed facility will address; high-level system-level design, including definition of key functional requirements and major systems; initial risk analysis and mitigation strategy for development and deployment, identifying enabling technologies, high-risk or long-lead items, and research and development (R&D) needed to reduce project risk to acceptable levels; and description of proposed Educational Outreach and Broader Societal Impacts, included in the proposed scope of work, budget and schedule.

A Preliminary Design is expected to update and refine the Conceptual Design. The Preliminary Design must also include a:

demonstration that key technologies or systems approaches are feasible or cost-effective (if identified as necessary to demonstrate in the Conceptual Design review); plans for management of the project during development and deployment, including preliminary partnership arrangements and international participation, oversight of major subawards and subcontracts, organizational structure and management of change control; and updated estimates for future operating costs, anticipated future upgrades, and Platform sustainment over its operating life.

The Project Schedule should include dates of key milestones, including releases of the following Platform planning documents:

- Platform Prospectus – Months 6, 18, and 24;
- Requests for Proposals (RFPs) – Months 9 and 18; and
- Platform Sustainment Plan – Months 12, 24, and 36.

II.4. Organizational Structure

The Organizational Structure should describe the structure and processes to be used to provide effective governance for the Platform, including ensuring productive, collaborative interactions with the Steering Group as well as the broader research and education community; and the approach to be used to identify and prioritize development activities and the competitive process to be used in the selection of development and deployment subawardees and consultants. Proposers should not identify specific development and deployment subawardees in proposals submitted in response to this solicitation.

Proposers should provide a table that provides the following information for each individual participating in the project: name, position/title on the project, level of effort (monthly and annually), activities assigned, and responsibilities for achievement of key project goals and milestones. Proposers should provide a functional project budget in tabular form showing how resources will be allocated. Proposers should also provide a plan for annual project critical self-assessments (i.e., measurable metrics); and discuss how the results of the self-assessment will be used for Project Office improvement.

II.5. TIPOFF Facilities

Proposers shall describe the office and meeting facilities that will be available for the Project Office, including office equipment, communications capabilities, and institutional meeting space necessary to conduct project business.

Supplementary Documents: In the Supplementary Documents section, upload the following information where relevant:

(1) *A list of Project Personnel and Partner Institutions:*

Provide current, accurate information for all personnel and institutions involved in the project. NSF staff will use this information in the merit review process to manage reviewer conflicts of interest. The list **must** include all PIs, Co-PIs, Senior Personnel, paid/unpaid Consultants or Collaborators, Subawardees, Postdocs, project-level advisory committee members, and writers of letters of support. This list should be numbered and include (in this order) Full name, Organization(s), and Role in the project, with each item separated by a semi-colon. Each person listed should start a new numbered line. For example:

- Mary Smith; XYZ University; PI
- Bob Adams; ABC Community College; Paid Consultant
- Susan White; Welldone Institution; Unpaid Collaborator
- Tim Green; ZZZ University; Subawardee

Single Copy Document:

Collaborators and Other Affiliations Information: In lieu of the instructions specified in the PAPPG, Collaborators and Other Affiliations Information should be submitted as follows.

For this solicitation, the Collaborators & Other Affiliations information specified in the PAPPG should be submitted using the spreadsheet template found at <https://www.nsf.gov/cise/collab>. For each proposal, a completed spreadsheet for each PI, co-PI, or senior personnel must be uploaded directly into Fastlane in .xls or .xlsx format as a "Collaborator and Other Affiliations" Single Copy Document. NSF staff use this information in the merit review process to help manage reviewer selection; the spreadsheet will ensure the Collaborator and Other Affiliations information has a common, searchable format.

Note the distinction to (1) above for Supplementary Documents: the listing of all project participants is collected by the project lead and entered as a Supplementary Document, which is then automatically included with all proposals in a project. The Collaborators and Other Affiliations are entered for each participant within each proposal and, as Single Copy Documents, are available only to NSF staff. Collaborators and Other Affiliations due to participants listed on (1) that are not PIs, co-PIs, or senior personnel can be uploaded under Additional Single Copy Documents using Transfer File.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. submitter's local time):

May 02, 2017

Full Proposal Deadline(s) (due by 5 p.m. submitter's local time)

D. FastLane/Grants.gov Requirements

For Proposals Submitted Via FastLane:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: <https://www.fastlane.nsf.gov/a1/newstan.htm>. For FastLane user support, call the FastLane Help Desk at 1-800-673-

6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

For Proposals Submitted Via Grants.gov:

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: <http://www.grants.gov/web/grants/applicants.html>. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

Proposers that submitted via FastLane are strongly encouraged to use FastLane to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in PAPPG Exhibit III-1.

A comprehensive description of the Foundation's merit review process is available on the NSF website at: https://www.nsf.gov/bfa/dias/policy/merit_review/.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Investing in Science, Engineering, and Education for the Nation's Future: NSF Strategic Plan for 2014-2018*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the strategic objectives in support of NSF's mission is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

NSF's mission calls for the broadening of opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence

in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. **Both** criteria are to be given **full consideration** during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (PAPPG Chapter II.C.2.d(i). contains additional information for use by proposers in development of the Project Description section of the proposal). Reviewers are strongly encouraged to review the criteria, including PAPPG Chapter II.C.2.d(i), prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
 - a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
 - b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

As part of a proposal's Intellectual Merit and Broader Impacts, the following review criteria will guide the reviewers' evaluation:

- Does the proposing team demonstrate strong experience—managerial, technical, and administrative—in projects similar in scope to that proposed here? Do prior contributions provide convincing evidence that the proposers understand and are prepared to handle the major challenges of this project? Does the proposing team have experience working with the networking research community, deploying computing and communications infrastructure, and running large, software-intensive projects?
- Do the goals, milestones, and activities proposed in the Project Development Plan cover all the essential aspects of Platform

design and development?

- Does the submitting organization provide a reasonable plan for risk mitigation? Are some foreseeable risks not adequately addressed?
- Does the project schedule appear reasonable? Were the key milestones identified?
- Has the proposing organization been diligent in investigating the roles, tasks, challenges of the current GPO?
- Does the submitting organization provide an adequate management plan? Is the managerial, organizational, and governance approach appropriate for an effective Project Office?

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review, Internal NSF Review, or Reverse Site Review.

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will generally be completed and submitted by each reviewer and/or panel. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

After programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications. After an administrative review has occurred, Grants and Agreements Officers perform the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award notice, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award notice; (4) the applicable award conditions, such as Grant General Conditions (GC-1)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at https://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp.

Special Award Conditions:

The Project Director for TIPOFF, in consultation with the cognizant NSF Program Officers and the Steering Group, will review and approve subcontracts and consultants.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the *NSF Proposal & Award Policies & Procedures Guide (PAPPG)* Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp.

The Project Office will be periodically evaluated by an independent evaluation team assigned by NSF, whose role will be to work with the Project Office and help it adhere to the requirements of this solicitation, provide NSF with an external independent assessment of TIPOFF activities and progress, and collect NSF-required performance data on a biannual basis. The Project Office is required to provide all necessary data and materials to the evaluation team in a timely fashion, in order to enable the team to fulfill its responsibilities.

The activities of the Project Office will also be monitored through quarterly interim progress reports. In lieu of a fourth-quarter report, an annual report on progress and plans will be submitted by the awardee to the cognizant NSF Program Officers. NSF will provide the format for these reports within one month of the award date. Both quarterly and annual reports must address progress of the Project Office regarding the duties outlined in this solicitation. If a Grantee-Approved No-Cost Extension to the project is exercised by the awardee organization, prior notification shall be provided to the cognizant Program Officers at least 60 days prior to such activity, and an interim annual report should be submitted along with said notification.

NSF shall conduct a TIPOFF site visit within nine months of its establishment (i.e., within nine months of initial awarding of NSF funds). Project Office members will travel annually to NSF headquarters in Virginia for briefings with NSF.

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- Jack Brassil, Program Director, CISE/CNS, telephone: (703) 292-8950, email: jbrassil@nsf.gov
- Kevin Thompson, Program Director, CISE/ACI, telephone: (703) 292-4220, email: kthomps@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF [Grants Conferences](#). Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match

their identified interests. "NSF Update" also is available on [NSF's website](#).

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this mechanism. Further information on Grants.gov may be obtained at <http://www.grants.gov>.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 55,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities (FASSED) provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See the *NSF Proposal & Award Policies & Procedures Guide* Chapter II.E.6 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at <https://www.nsf.gov>

Location:	4201 Wilson Blvd. Arlington, VA 22230
For General Information (NSF Information Center):	(703) 292-5111
TDD (for the hearing-impaired):	(703) 292-5090
To Order Publications or Forms:	
Send an e-mail to:	nsfpubs@nsf.gov
or telephone:	(703) 292-7827
To Locate NSF Employees:	(703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, [NSF-50](#), "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and [NSF-51](#), "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full

and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton
Reports Clearance Officer
Office of the General Counsel
National Science Foundation
Arlington, VA 22230

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